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Occasional Papers on the Kinds of Plants

By Robert T. Clausen

Some Cultivated Plants

23. Status of Robinia hispida
24. Review of the Cyanastraceæ
25. Various rare or unusual cultivated plants

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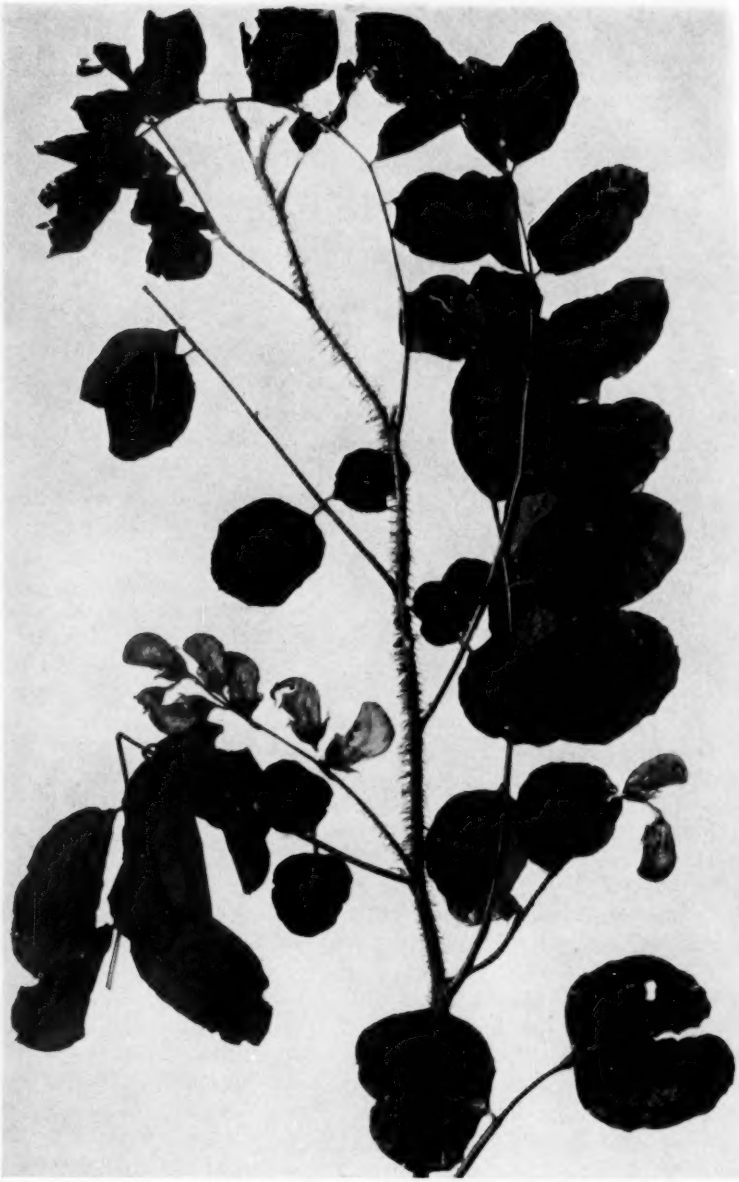


185. TYPE SPECIMEN OF *Robinia hispida*. Sheet is in the Linnean Herbarium and is labelled *hispida* by Linnæus. (×⅓.)

## ARTICLE 23. ON THE STATUS OF ROBINIA HISPIDA.

The writer collected a series of cultivated Robinias in 1938. He intended quickly to check the identifications of these and then to insert the specimens in the herbarium at the Bailey Hortorium, but instead of achieving this end at once, he has had to prolong the project of verifying the specimens for over a year. Today the status of some of them still remains a mystery. Several reasons may be cited for this delay: unsatisfactory understanding of the limits and proper interpretation of the species of Robinia, contradictory statements in the literature, poor and confusing keys, and lack of a biological basis for the classification.

As now interpreted in taxonomic literature, the Robinias of the southeastern United States are in great confusion. Recognizably distinct variants have been described and maintained as species without careful consideration of the biological principles involved. No attempt has been made to work out in detail geographical relationships, nor have there been comprehensive genetical or cytological studies of native plants. T. W. Whitaker (Journ. Arn. Arb. xv, 353-357, 1934) has investigated the chromosome number and morphology of cultivated specimens at the Arnold Arboretum, but since his data are not the result of the study of large series of wild plants, it is difficult for the taxonomist to employ them effectively in elucidating his problems. Such experience demonstrates the desirability for projects of this sort to be undertaken jointly by a cytologist and taxonomist rather than by only one worker. The taxonomist can often direct the cytologist to critical plants that particularly require attention. Herbarium specimens should be prepared of each plant investigated and chromosomal data placed on the herbarium labels or, at least, attached to the sheets.

In the present discussion, the writer wishes to call attention to the troubles in Robinia by presenting what he knows about the problem of *R. hispida* and *R. fertilis*. Many of the other species offer similar difficulties, but these are not discussed here.

*Robinia hispida* was described by Linnæus (Mantissa i, 101, 1767) as: "*Robinia* ramis axillaribus, foliis impari, pinnatis, caule inermi hispido." This description is sufficiently generalized to permit its application to several modern segregates. Fortunately, Linnæus supplied references to three illustrations and left in his herbarium a specimen labelled in his own handwriting. Of the three illustrations, that of Jacquin (Enum. Pl. Carib. p. 211, pl. 179, 1763) represents *Lonchocarpus sepium* of the West Indies and northern South America; that of Miller (Gardener's Dictionary, p. 163, pl.

244, 1760) matches the Linnæan type of the species; while that of Mark Catesby (Natural History of Carolina, Florida and the Bahama Islands, Appendix, p. 20, pl. 20, 1754) represents a strange tree that seems to be 30-40 feet high. One might infer that the artist who prepared the Catesby illustration used a specimen of *R. PseudoAcacia* as a model, merely adding hairs and coloring the flowers pink. No prickles are shown, unless the fine short hairs are supposed to be considered as such.

The writer has based his interpretation of the species on the Linnæan type. This specimen consists of a portion of branch with leaves and two inflorescences. Details may be made out from Fig. 185. This represents a shrub with bristly branches that is widespread in the southern Appalachians. Many writers, after Linnæus, continued to designate this plant by the binomial, *R. hispida*, despite the fact that there are notable variations. Then W. W. Ashe* began to study the group and described several species as new. These represented variations which the older writers had referred to *R. hispida*. They were based on characters afforded by pubescence, shape of leaflet, height, and degree of fruiting. Among them was *R. fertilis*. In the original description, Ashe failed clearly to mention how to distinguish this species from *R. hispida*, to which it is most closely related. Also, he did not designate a type. Last year, through the kindness of W. C. Coker of the University of North Carolina at Chapel Hill, the writer had the opportunity to examine an herbarium specimen (Fig. 186) collected by Ashe from a cultivated plant in Graham County, North Carolina. This is marked "type plant." The leaflets are oblong or oblong-lanceolate, obtuse rounded or rarely acute at apex, mucronate, and glabrous beneath except on the veins, where puberulent. The several pods are densely bristly. From the Linnæan type of *R. hispida*, this differs in the longer narrower less blunt leaflets, but otherwise is closely similar.

Two authors, Small (Man. Southeastern Flora, p. 699-702, 1933) and Rehder (Man. Cult. Trees and Shrubs, p. 505-508, 1934) have published contradictory characters for separating *R. fertilis* and *R. hispida*. The former said that *R. fertilis* attains a height of 1 meter (*R. hispida*, 2 meters); the standard-blade is 3 cm. wide (2.5 cm. in *R. hispida*); and the blades of the leaflets are lanceolate or ovate and acute. On the other hand, Rehder said that *R. fertilis* is a shrub similar to the preceding species but taller, to 2 meters, with smaller flowers, 2-2.5 cm. long, and freely fruiting; also that the leaflets are elliptic-ovate to oblong-ovate, acute or acutish, slightly pubescent beneath. It is at once apparent that these writers agreed on only one of the differentiating characters, namely leaflet shape, and not exactly on that. They reversed the others. From the original account by Ashe (Rhodora xxv, 182-183, 1923), we gain only the following elucidation: "In

*_Robinia longiloba_, in Notes on trees and shrubs. Bull. Charleston Mus. xiv, 30 (1918). The eastern shrubby species of Robinia. Journ. Elisha Mitchell Sci. Soc. xxxvii, 175-177 (1922). Notes on shrubs of the southeastern states. Journ. Elisha Mitchell Sci. Soc. xxxix, 111-112 (1923). Robinia, in Notes on trees and shrubs of the southeastern United States. Rhodora xxv, 180-183 (1923.)

cultivation the flowering season of this showy plant, much like *R. hispida*, is prolonged. It has the same habit as *hispida* and becomes a symmetrical treelike shrub, 1.3-2 m. high." In his formal description, Ashe stated that the leaflets are oblong-ovate and nearly glabrous. To summarize the evidence afforded by study of the literature, the type specimen of *R. fertilis*, and a photograph of the type of *R. hispida*, the writer finds that Ashe's species differs in having more elongate acutish leaflets, in being a taller shrub, and in fruiting freely,—characters scarcely sufficient for specific segregation. As a result of observation of the gross morphology of series of specimens representing the two binomials, it appears that there are specimens which are certainly intermediate, also that the characters available for differentiation are insufficiently important. Accordingly, the writer is inclined to consider the plants together as a single variable species.

186. TYPE SPECIMEN OF *Robinia fertilis*. Sheet is in the herbarium of the University of North Carolina. (×⅓.)

Whitaker reported a chromosome number of n = 10 for *Robinia fertilis* and of n = 15 for *R. hispida*. For the former species, he determined the pollen sterility as 19 per cent, while for the latter he reported 88 per cent sterility. From this evidence he con-

cluded that *R. hispida* is a triploid, biologically representing a clon which very rarely produces seed-pods. Further, he suggested that since *R. hispida* and *R. Boyntonii*, another triploid investigated, are most closely allied to *R. fertilis*, perhaps they may have originated from that species. The writer has corresponded with Dr. Whitaker about the specimens on which he did his work. According to him, these were plants cultivated at the Arnold Arboretum and in the herbarium at that institution are herbarium specimens representing two plants with numbers studied by him.

The writer is indebted to the authorities at the Arnold Arboretum for the privilege of having on loan for study all specimens of *Robinia hispida* and *R. fertilis* available there. Among them, he had opportunity to study the specimens investigated by Whitaker. One of these plants is *R. hispida*, the other *R. fertilis*. They apparently represent the basis for the cytological conclusions. The collection no. 15610, labelled *R. hispida*, is probably nearer to that than to *R. fertilis*, but it is not in all respects typical. The specimen has the appearance of a young shoot with abnormally large leaflets. No. 11013, representing *R. fertilis*, seems to be a fair example of Ashe's species, but it is a little more extreme than the type in the direction of narrow acutish leaflets.

The cytologist has given a clue and a start for placing the taxonomy of Robinia on a biological basis, but much more material must be studied. If *R. hispida* is a sterile triploid of *R. fertilis*, then it should not be accorded full specific rank, but should be treated as one of the variants of a polymorphic species. Since the writer reached this same conclusion using the observational methods of the taxonomist and ignoring the cytological data, he now proposes that the two populations should no longer be designated by separate binomials. Since the first name to be applied to a species, in this instance *R. hispida*, must be employed for the group even though the nomenclatorial type is not the same as the biological one, *R. fertilis* must be reduced to varietal status under *R. hispida*. Because the two types of plants are commonly cultivated, varietal status is accorded them for the convenience of growers.

*Robinia hispida* (*sensu latiore*) may now be recharacterized as a stoloniferous shrub, 1-3 meters high, with the branches, petioles, and peduncles usually glandular-bristly-hispid, with the bristles 2-5 mm. long and with short hairs intermixed: leaves pinnately compound, 5-30 cm. long, with 4-8 pairs of leaflets; petioles 1-4 cm. long; leaflets oblong, oblong-elliptical or suborbicular, acute, obtuse, or broadly rounded, apiculate, 0.5-7.5 cm. long, 0.3-4.5 cm. wide, either glabrous beneath except on veins or puberulent: peduncles 5-12 cm. long, 3-11-flowered; flowers pink, 1.6-2.5 cm. long, in racemes, with the calyx 8-11 mm. long and with the lobes long-acuminate, with some gland-tipped teeth; corolla pink: fruits 3-8 cm. long, densely hispid, with seeds 3-5 mm. long. Mountains of "Virginia," North Carolina,

South Carolina, Georgia, and "Alabama." Cultivated and escaped throughout its natural range and northwards at least to Massachusetts and New York.

Key to the varieties of *Robinia hispida*

A. Leaflets oblong to oblong-elliptical, acute or acutish at apex: plant fruiting freely, attaining a height of 2-3 meters..... *R. hispida* var. *fertilis*

AA. Leaflets oblong to suborbicular, obtuse or broadly rounded at apex: plant rarely fruiting, attaining a height of 1-2 meters..... *R. hispida* var. *typica*

† **Robinia hispida** var. **fertilis,** stat. nov.

*Robinia hispida* Michx., not Linn., in herbarium of the Museum d' Histoire Naturelle, Paris.

*Robinia fertilis* Ashe, in Rhodora, xxv, 182 (1923). No type or native region is mentioned in the original description. In the herbarium of the University of North Carolina is a cultivated specimen which is labelled "Type plant."

This variety is native in dry woods of North Carolina and Georgia, where it flowers in early May and matures fruits in the summer. In the northern states it is rather widely cultivated and frequently escapes. The writer has studied specimens of native plants from Burke, Graham, Macon, and Onslow counties, North Carolina, and from DeKalb County, Georgia, also escaped or cultivated material from Massachusetts, Connecticut, New York, District of Columbia, North Carolina, Louisiana, California, and Germany.

**Robinia hispida** Linn., var. **typica**

*Robinia hispida* Linn., in Mantissa i, 101 (1767). Based on three references in the literature. Nativity is given as Carolina and Carthagena. An herbarium specimen labelled by Linnæus is assumed to be the type.

The var. *typica* is a shrub of rocky ridges, open wooded slopes, and old fields in "Virginia," North and South Carolina, Georgia, and "Alabama." It is also extensively cultivated in the North, where it escapes from cultivation and persists, especially along roadsides and in waste places. The writer has studied herbarium specimens of indigenous material from Haywood, Macon, Madison, and Watauga counties, North Carolina; Aiken and Oconee counties, South Carolina; and Banks, Dade, Habersham, and Rabun counties, Georgia; also cultivated and escaped plants from Massachusetts, Connecticut, New York, New Jersey, Pennsylvania, North Carolina, Michigan, and Germany. In the South it flowers in the last part of April and in May, but in the North the flowering time extends from the middle of May through June and sometimes into July. It apparently fruits very rarely. Accurate data for the altitudinal distribution of this and the preceding variety are not available.

Specimens intermediate between the vars. *fertilis* and *typica* have been seen from Macon County, North Carolina; Oconee County, South Carolina; and DeKalb County, Georgia. Such material should receive the special attention of the cytologist.

As employed by the writer, following Article 30, Recommendation 18, of the International Rules of Botanical Nomenclature, the epithet var. *typica* is not regarded as a new name, but as a parenthetical practical device to permit accurate designation of the typical element of a species. It has no nomenclatorial standing and does not require the citation of an authority. Whenever a variety or a subspecies is described or placed in a species, the typical element of that species automatically becomes variety or subspecies *typica*.

Under *Robinia hispida*, two varieties have been described: var. *rosea* Pursh and var. *macrophylla* DC. These are probably best referred to var. *typica* as minor variants too slight to warrant formal recognition today.

*Robinia Unakæ* Ashe (Journ. Elisha Mitchell Sci. Soc. xxxix, 111, 1923) was originally distinguished from *R. hispida* by its lower habit (2-6 dm.), shorter, weaker and paler-colored bristles, less showy flowers, and its habit of fruiting abundantly. Although it seems definitely to belong to the collective species, *R. hispida*, the writer has no clear opinion as to its exact status. It represents a population that requires careful field investigation by the taxonomist and cytologist.

In conclusion, the writer wishes to express his appreciation for assistance of various kinds to the following botanists: Prof. Rehder and Dr. Kobuski of the Arnold Arboretum, Mr. C. A. Weatherby of the Gray Herbarium and Dr. T. W. Whitaker of the United States Department of Agriculture. He is also grateful for the privilege of studying specimens in the herbaria of Cornell University, Harvard University, the New York Botanical Garden, and Rutgers University.

# ARTICLE 24. A REVIEW OF THE CYANASTRACEÆ.

Interest in the group Cyanastraceæ began with a plant in the Conservatory House of the Department of Floriculture at Cornell University. In the course of routine collecting, I noticed that this tuberous-rooted scapose herb was labelled Rajania, a genus of warm-climate vines. Realizing that there must be some mistake, I collected a specimen and vainly endeavored to key it out. For a long time it remained a puzzle. Finally, at the New York Botanical Garden, it was identified as Cyanastrum, species not designated.

The attempt to determine the species of this plant led to a review of the entire genus. The original descriptions of all the species were consulted and photographs of the types, or in some cases the types themselves, were examined. No previously described species exactly matched my Cornell specimen, but it seemed more closely related to *Cyanastrum cordifolium* than to anything else. In the greenhouses at the New York Botanical Garden, there is a plant exactly like that cultivated at Ithaca. This is labelled *Cyanastrum cordifolium*, but it differs from that species in having the inflorescence more compact, the floral bracts broad and blunt, and the perianth parts always erect. This had been obtained from the botanical garden at Berlin, where it came originally from Africa. Since Cornell University once received a considerable shipment of hothouse plants from the New York Botanical Garden, it seems likely that the Cyanastrum was among these and that the present Ithaca stock is the same as that at the Bronx (New York). Further, it seems reasonable to suppose that in cultivation the species may have changed somewhat in character. Instead of describing the cultivated plant as a new species, it seems better to regard it as a variation or extreme of *Cyanastrum cordifolium* and to designate it by a varietal name.

The generic name Cyanastrum was first employed in the sense used here by Oliver, in 1891, in Hooker's Icones Plantarum, ser. iii, x, t. 1965. I am maintaining this name here despite the existence of an earlier homonym, Cyanastrum of Cassini, in Dictionnaire des Sciences Naturelles, xliv, 39, 1826. Cassini provided this name as an alternative for his generic name Cyanopsis. According to the homonym rule, his name invalidates that of Oliver. I have corresponded about this matter with Miss M. L. Green (now Mrs. T. A. Sprague) of the Royal Botanic Gardens, Kew, England. She has kindly checked the above references and suggested that the name Cyanastrum of Oliver be proposed for conservation. Accordingly, I have brought the matter to the attention of C. A. Weatherby, who is responsible

for the letter C in the current list of *Nomina generica conservanda proposita*. He has consented to present the case at the next International Botanical Congress, where it is hoped it may be received favorably. Since Cyanastrum, with one exception, is the only name under which the several species discussed below have been treated, while the family name is based on it, there seems good reason to conserve it in order to avoid confusion and the necessity of making new combinations.

The history of the group begins with the publication by Oliver of *Cyanastrum cordifolium* from west tropical Africa. This species was first assigned to the Hæmodoraceæ, since Oliver thought his plant had affinity with the South African genus Cyanella. A few years later, Cornu (Bull. Soc. Bot. France, xliii, 21-24, 1896) described this same species as *Schoenlandia gabonensis*, but placed it in the Pontederiaceæ. Engler (Die Nat. Pflanzenfam., Nachträge zum II Teil, p. 70, 1897) made Schoenlandia a synonym of Cyanastrum, referring *S. gabonensis* to *C. cordifolium*, but followed Cornu in referring the genus doubtfully to the Pontederiaceæ. J. G. Baker (Fl. Trop. Afr. vii, 336, 1898) returned to Oliver's original concept in placing Cyanastrum again in the Hæmodoraceæ. He also added a new species, *C. Johnstonii*, based on specimens obtained by H. H. Johnston in 1889. This collection had previously been mentioned by Oliver, but without a specific name. Engler (Bot. Jahrb. xxviii, 357-359, 1900) distinguished two additional species, *C. hostifolium* and *C. Goetzeanum*, and formally described the Cyanastraceæ as a family for the single genus, then containing four species. Since 1900 E. De Wildeman (Ann. Mus. Congo, ser. iv, pt. 1, p. 5-6, 1902 and Fedde Repert. xi, 517, 1913) added two new species, *Cyanastrum Verdickii* and *C. Hockii*, while Engler (Bot. Jahrb. xxxviii, 88, 1907) described *C. Bussei*. So far as I am aware, there has never been published in the English language a review of the family.

For help and advice in this study, I am grateful to the following individuals and institutions for the loan of valuable material or for helpful information: Sir Arthur W. Hill and Miss M. L. Green, Royal Botanic Gardens, Kew, England; P. J. McKenna, New York Botanical Garden; Muséum d'Histoire Naturelle, Paris, France; Dr. A. R. Pilger, Botanischer Garten und Museum, Berlin-Dahlem, Germany; and Prof. Dr. W. Robyns, Director, Jardin Botanique de l'Etat, Brussels, Belgium.

In the text, names of herbaria are abbreviated as follows: Bailey Hortorium, Cornell University, Ithaca (BH); Botanischer Garten und Museum, Berlin (B); Jardin Botanique de l'Etat, Brussels (Br); Royal Botanic Gardens, Kew (K); Muséum d'Histoire Naturelle, Paris (P); New York Botanical Garden, New York (NY); United States National Herbarium, Washington (US).

**CYANASTRACEÆ** Engler, in Bot. Jahrb. xxviii, 357 (1900).

A family of the Order Farinosæ, suborder Pontederiineæ, containing a

single genus, Cyanastrum, represented in tropical Africa. The characters are as for the genus. The group is distinguished from the Pontederiaceæ by the very short perianth-tube, the inferior ovary, and the regular flowers, also by the terrestrial habit and tuberous rootstocks.

**CYANASTRUM** Oliver (not Cassini), in Hooker's Icones Plantarum, ser. iii, x, t. 1965 (1891). Genotype, *C. cordifolium* Oliver, the species on which the genus was founded. The name apparently alludes to the genus Cyanella with which Oliver thought his plant had affinity, also to the bluish star-shaped (?) flowers.

*Schoenlandia* Cornu, in Bull. Soc. Bot. France. xliii, 24 (1896). Genotype, *S. gabonensis*, Cornu, from Gabon, Africa. Cornu distinguished his genus from all others of the Pontederiaceæ by the regular flowers with the perianth parts distinct, by the apically dehiscent anthers, by the solitary seeds, and by the exalbuminous embryos.

Perennial herbs arising from a depressed globose corm or from a series of articulated dorsi-ventrally flattened tubers bearing thick fleshy roots and one or several leaves and a flowering shoot: leaves oblong-lanceolate or cordate with the principal veins arcuate-ascending, mostly parallel or subparallel: inflorescence racemose or paniculate; flowers perfect, regular, with the perianth parts 6, equal and free except at the base where they are joined to form a very short tube; stamens 6 with the short glabrous filaments inserted on the bases of the perianth parts and with the narrowly linear anthers dehiscing apically; ovary inferior, 3-celled, each cell with 2 anatropous ovules; style filiform; stigma very short, trifidous: fruit a one-seeded capsule. A genus of seven species of tropical Africa.

The species of Cyanastrum seem to fall naturally into three groups: those with the flowers bracteate and the leaves cordate, those with the flowers bracteate and the leaves oblong-lanceolate, and those with the flowers ebracteate. Eventually, when the anatomy of these plants is better known, and when more species are described, it may be desirable or even necessary to designate subgenera or to segregate certain of the species from the original genus, but present knowledge does not require such procedure.

KEY TO THE SPECIES OF CYANASTRUM

A. Each flower of the inflorescence borne in the axil of a bract.
  B. Leaves cordate.
    C. Floral bracts lanceolate, ovate, or even suborbicular, sheathing the stem: flowers 1-3 in an inflorescence ..... 1. *C. cordifolium*
    CC. Floral bracts linear, not sheathing the stem: flowers 6-8 in an inflorescence.
      D. Flowers 8: floral bracts persistent ..... 2. *C. Goetzeanum*
      DD. Flowers 6-7: floral bracts caducous ..... 3. *C. Johnstonii*
  BB. Leaves lanceolate, oblong-lanceolate, oblong, or ovate, not cordate.
    E. The leaves oblong-lanceolate, 8-14 cm. long: floral stem with the basal bracts much enlarged, foliaceous; bracts subtending flowers linear ..... 4. *C. hostifolium*
    EE. The leaves petiolate, long-lanceolate, 25-30 cm. long: floral stem with all the bracts small, not foliaceous, lanceolate or linear-lanceolate, scarious ..... 5. *C. Bussei*

AA. Each flower of the inflorescence not borne in the axil of a bract.
F. Flowers 13-18; floral stem with the upper bracts not clasping . . . 6. *C. Verdickii*
FF. Flowers 4-5; floral stem with the upper bract clasping . . . . . 7. *C. Hockii*

1. **Cyanastrum cordifolium** Oliver, l.c.

Scapose perennial herb from a subglobose corm, 3-7 mm. in diameter, or from a series of articulated dorsi-ventrally flattened tubers, 0.5-2.2 cm. long, 0.8-1.4 cm. high: leaves cordate-ovate, glabrous, with arcuate main veins and reticulate intermediate veinlets, bluntly acuminate, 2-17.5 cm. long, 2.5-13.5 cm. wide, with the sinus 1-6 cm. deep, and with the petiole 3-30 cm. long bearing a sheathing bract 3.5-6 cm. long: fertile shoot with 1 to 3 bracts and the inflorescence racemose: peduncle 1.0-14.0 cm. long; bracts sheathing, lanceolate to ovate or orbicular, 0.8-3.5 cm. long, 0.7-2 cm. wide; flowers 1-3, with bracts 1.0-2.5 cm. long, 0.5-2.0 cm. wide; tepals blue or violet, elliptical or obovate, 9-12 mm. long, 4-5 mm. wide; stamens usually 6, rarely 3, with the anthers narrowly linear, 4 mm. long, and the filaments 5 mm. long; ovary 3-celled, with a slender style; seeds reddish-brown, smooth, oblong flattened, but with margins rounded, 4 mm. high, 6-7 mm. long, 5 mm. wide.

On a basis of the length of the floral stalk, the shape of the floral bracts, and the orientation of the tepals, this species may be divided into three varieties:

A. Floral stem long and slender, equalling the leaves, with the bracts lanceolate; tepals horizontally spreading . . . . . *C. cordifolium* var. *typicum*
AA. Floral stem shorter than the leaves, with the bracts broadly ovate or almost orbicular.
B. Peduncle short, 5-8 cm. long; tepals horizontally spreading . . . . . *C. cordifolium* var. *brevipedunculatum*
BB. Peduncle very short, 1-2.5 cm. long; tepals always erect, horizontally spreading only towards apex; inflorescence much compacted . . . . . *C. cordifolium* var. *compactum*

**C. cordifolium** Oliver var. **typicum.** Fig. 187. Based on specimens from west tropical Africa: Sierra d. Crystal and Ambas Bay, *Mann;* Cameroons, near the shore, Kalbreyer; Yoruba Expedition, *Millson.* The figure accompanying the original description has been taken to typify the species.

*Schoenlandia gabonensis* Cornu, l.c. Based on material received in 1887 from Mr. Pierre, head gardener of the Garden of Essai at Libreville, Gabon. Since the original description agrees very closely with *Cyanastrum cordifolium* Oliver, I am following Engler in referring the name here, despite the fact that I have not seen the type.

The var. *typicum* is characterized by the slender fertile shoot which usually equals the leaves, the lanceolate bracts which are not overlapping, and the horizontal tepals. Its range includes Nigeria, Cameroons, and French Congo. From herbarium labels one learns that this plant grows, "often gregariously," in dense shade in the forest.

According to Cornu, the negroes of Africa use all parts of this plant to cure carbuncles.

Specimens have been examined as follows: Nigeria, *J. D. Kennedy 2713* (K); Yoruba, *A. Millson 89* (K). Cameroons, *Kellreyer 89* (K); "Zur Victoria n. Bimbia, Luftaw Wald?" *Preusz 1239* (B); Ahmey River, Corisco Bay, *R. Schlechter 12830* (Br). French Congo, Ufoa, 85 miles east of Gaboon, *G. L. Bates 540* (K).

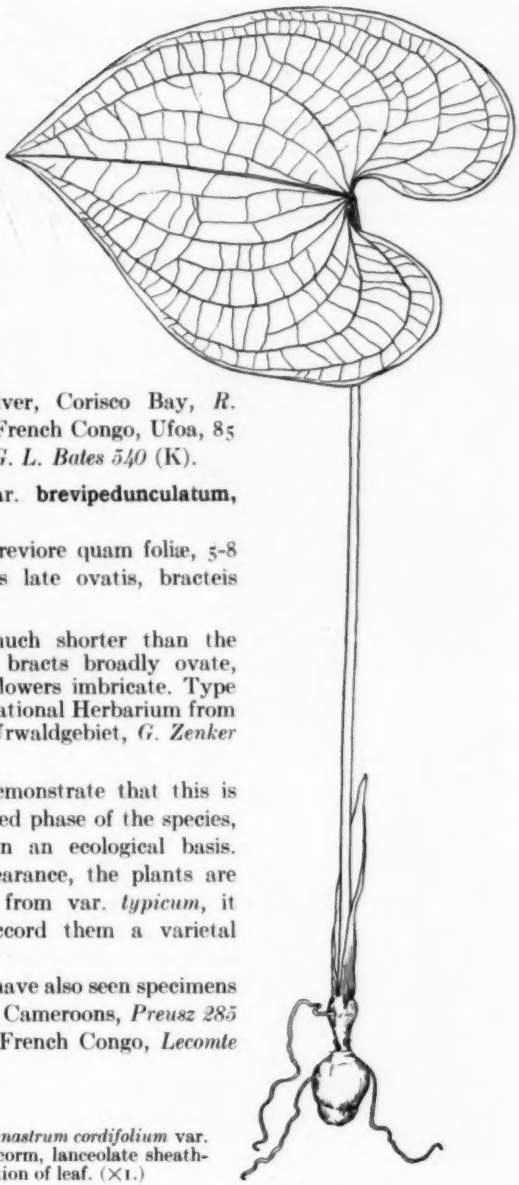
†**C. cordifolium** var. **brevipedunculatum,** var. nov. Fig. 188.

Pedunculo multo breviore quam foliæ, 5-8 cm. longo, et bracteis late ovatis, bracteis floralibus imbricatis.

Flowering shoot much shorter than the leaves, 5-8 cm. long, bracts broadly ovate, those subtending the flowers imbricate. Type in the United States National Herbarium from Cameroons, Bipinde, Urwaldgebiet, *G. Zenker 3669*.

Field work may demonstrate that this is merely a short-peduncled phase of the species, explainable perhaps on an ecological basis. Since, in general appearance, the plants are considerably different from var. *typicum*, it seems desirable to accord them a varietal designation.

Besides the type, I have also seen specimens from Barombi Station, Cameroons, *Preusz 285* (B) and from Kitabi, French Congo, *Lecomte A79* (P).



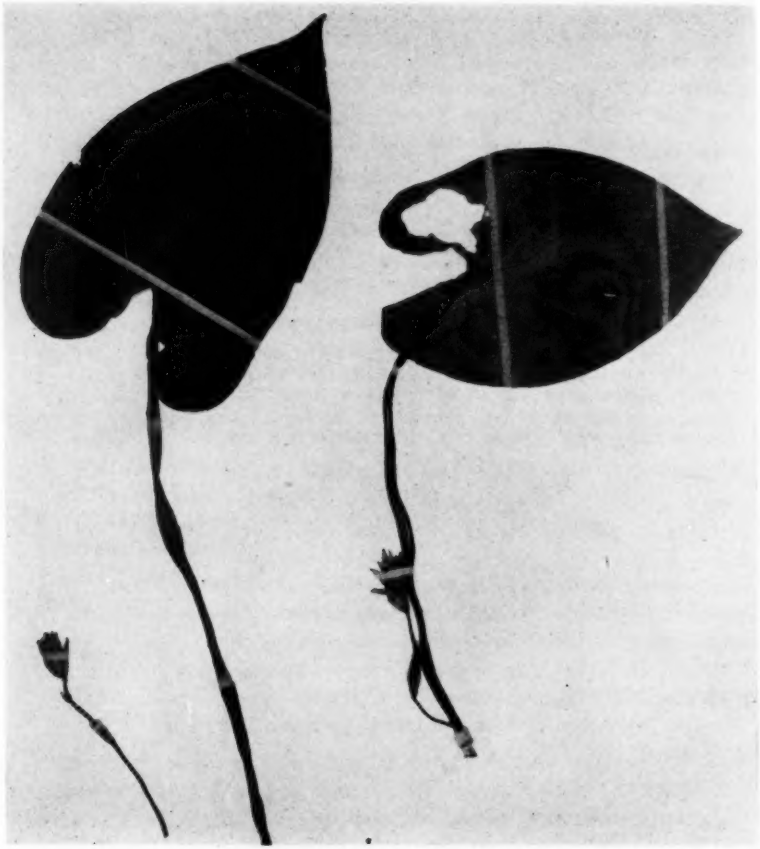
187. STERILE PLANT of *Cyanastrum cordifolium* var. *typicum*. Note subglobose corm, lanceolate sheathing bract, and venation of leaf. (×1.)

†**C. cordifolium** var. **compactum,** var. nov. Fig. 189.

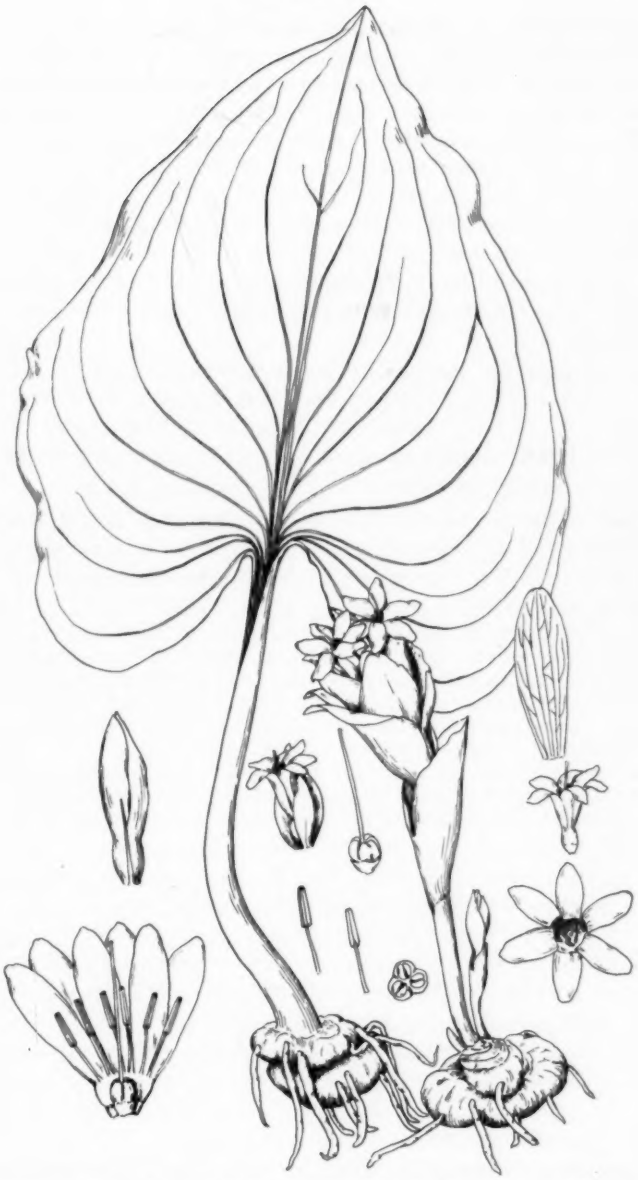
Pedunculo 1-2.5 cm. longo et bracteis late ovatis, 1-1.8 cm. longis, 0.5-1.2 cm. latis, imbricatis; tepalis erectis, solum ad apicem horizontaliter recurvatis.

Plant with the peduncle 1-2.5 cm. long and with the bracts broadly ovate, 1-1.8 cm. long, 0.5-1.2 cm. wide, imbricate, with the tepals erect, only towards apex horizontally spreading. Type in the herbarium of the Bailey Hortorium, Cornell University, from a plant cultivated in the greenhouse of the Department of Floriculture, Cornell University, *R. T. Clausen H42*.

In my early studies of this plant, I thought that it represented an un-



188. Type sheet of *Cyanastrum cordifolium* var. *brevipedunculatum*. (×⅔.)



189. DETAILS OF *Cyanastrum cordifolium* var. *compactum*. Two plants and flowers from side ×1; flower from above ×2; all other parts (×5).

described species, so different did it seem from the plant illustrated with the original description of *Cyanastrum cordifolium* Oliver. At this period of my investigation, I used a manuscript specific name to designate the cultivated plants. Examination of herbarium specimens from the wild revealed that *C. cordifolium* definitely varies in the direction of this variety, but no African specimens were seen which exactly matched it in the very short peduncle with the overlapping broad bracts. Besides the type, I have studied a specimen from the conservatories at the New York Botanical Garden, *N. Taylor 16207* (NY).

This variety thrives in the warm-house at Ithaca, New York. It is a desirable subject for its dark green cordate leaves. It has flowered at Ithaca in June and July.

2. **Cyanastrum Goetzeanum** Engler, in Bot. Jahrb. xxviii, 359, pl. 10, A-C (1900). Based on specimens from Uhehe in the Uluguru Mountains, Tanganyika Territory, Africa, *Goetze 438*. The figures accompanying the original description have been taken to typify the species.

Since I have not seen the type, which could not be borrowed from the herbarium at Berlin, and since this seems to be the only herbarium specimen in existence, I am presenting Engler's original description.

"Rhizomate tuberoso, tubere articulato; cataphyllis 1-2 vaginaceis; folio solitario, petiolo quam lamina cordiformis duplo longiore, laminæ lobis posticis semiovatis quam lobus anticus late triangularis 1½-plo breviore, nervis lateralibus numerosis arcuatim adscendentibus venis inter illos transversis; scapo laterali folia æquante; cataphyllis 2-3 valde remotis; racemi vel paniculæ laxifloræ bracteis lineari-lanceolatis remotis, inferioribus 1-2 ramulum biflorum, superioribus pedicellum solitarium fulcrantibus: pedicello basi bracteolis 2 subulatis instructo; perigonii tepalis oblongis subacutis, plurinervis basi cohaerentibus; staminum filamentis quam antheræ subquadrangulae duplo brevioribus; ovario profunde trilobo, lobis subglobosis."

This seems best distinguished from *C. cordifolium* by the linear floral bracts which do not sheathe the peduncle and the more lax inflorescence with about eight flowers. Engler emphasized that only one leaf is produced at a time, but, since plants of *C. cordifolium* occasionally may likewise have only a single leaf, this character does not seem satisfactory.

3. **Cyanastrum Johnstonii** Baker, in Thiselton-Dyer Fl. Trop. Afr. vii, 336 (1898). Based on incomplete specimens collected by Sir H. Johnston, in 1889, on the hills between Lakes Tanganyika and Nyassa, at an elevation of 5,000 feet. The type in the Kew Herbarium has not been available to me.

Knowledge of this species rests on the original incomplete specimens and on a collection of *R. E. Fries 1331* (B). Although Baker really did not

formally describe *C. Johnstonii* because Johnston's material was inadequate, yet his name is now in the literature and there seems no good reason to ignore his publication. According to Baker, the species is close to *C. cordifolium*, but has larger flowers, about six in a raceme, with deciduous bracts. The stem has a linear membranous bract-leaf at or below the middle, while the leaves are said to be ample and the flowers blue.

A photograph of the Fries collection has been supplied from the herbarium at Berlin by R. Pilger. This agrees rather well with Baker's comments. It comes from Kalambo in northeastern Rhodesia. The leaf is cordate, obtuse at apex, about 14 cm. long and 10 cm. wide. The petiole is inclosed below in a long sheathing bract. The floral stem has a linear foliaceous bract about 3.7 cm. long. There seem to be about seven flowers, but from the photograph it is difficult to determine whether certain details represent pedicels or persistent linear bracts. It is impossible to provide the details concerning the flowers without an actual specimen for study.

4. **Cyanastrum hostifolium** Engler, in Bot. Jahrb. xxviii, 358, pl. 9 (1900). Based on specimens from Tanganyika Territory: Uluguru, *Stuhlmann* 1894; and between Khutu and Uhehe, at 500 m., *Goetze 394*. I have not seen the type, but have taken the plate accompanying the original description to typify the species.

Plant 10-32 cm. high; rootstock of one or several disciform tubers, each about 1.5 cm. long and 0.8 cm. high, bearing a single shoot with 1-3 foliage leaves and terminating in a paniculate inflorescence: leaves oblong-lanceolate or oblong-oblanceolate, 8-14 cm. long, 4 cm. wide, abruptly short-acuminate, acute, sheathing at base, with the principal veins essentially parallel, arcuate-ascending, connected by numerous transverse veinlets: peduncle 5-12 cm. long, naked, lowest floral bract foliaceous, lanceolate, others linear or narrowly linear-lanceolate, 1-2.5 cm. long, 1-2 mm. wide, not sheathing; tepals 6, white, lanceolate, 6-7 (-10?) mm. long; stamens 6 with the anthers 3 mm. long and the filaments 1 mm. long; ovary inferior.

By the bracteate inflorescence and the oblong lanceolate leaves this species is distinguished from all but *C. Bussei*, from which it differs in having the lowest bract foliaceous and lanceolate and the leaves shorter and relatively broader.

I have seen specimens from Tanganyika Territory and Portuguese East Africa (Mozambique): Tanganyika Territory, District of Lindi, 100 km. west of Lindi, 500 m. alt., abundant on the plateau, Oct. 24, 1934, *H. J. Schlieben 5537* (Br). Portuguese East Africa, sandy land, mouth of Niralu River, *C. E. F. Allen 91* (K); without specific locality, *J. Stocks* (K); also *G. Sousa 879* (K).

5. **Cyanastrum Bussei** Engler, in Bot. Jahrb. xxxviii, 88 (1907). Based on specimens from Tanganyika Territory, District of Lindi, Makondeland, Seliman-Mamba, *Busse 2667*. I have

studied a photograph of the type which is deposited in the herbarium in Berlin.

This species apparently is known only from the original description. Since no specimens were available to me, I quote Engler's diagnosis.

"Rhizomate crasso articulato, articulis crasse disciformibus, summo radices longos filiformes emittente, cataphyllis paucis et foliis pluribus ante anthesin, convolutis; foliorum petiolo canaliculato in laminam sensim transeunte, lamina tenuiter herbacea quam petiolus pluries longiore, lanceolata, interdum apice cuspide inferne tubulosa instructa, nervis lateralibus 1 utrinque 3-4 adscendentibus, secundariis tenuioribus 1-2 inter primarios interjectis, venis tenuibus transversis; caule florifero folia subæquante leviter compresso, pseudoracemoso, bracteis lanceolatis scariosis pedicellos superantibus; bracteis posticis lineari-lanceolatis parvis; pedicellis apice turbinatim incrassatis trigonis subsecundis, omnibus quam tepala duplo vel magis brevioribus; tepalis oblongis obtusiusculis albis, in planitie verticali stellatim expansis; staminum filamentis crassiusculis sursum paullum attenuatis, quam antheræ crassæ quadrangulæ atque obtusæ paullum brevioribus; ovario axi florali immerso, trilobo, in stilum conoideum filamenta paullum superantem attenuato."

According to Engler, this is readily distinguished from *C. hostifolium* by the petiolate leaves which are long and lanceolate, 25-30 cm. long and 6 cm. wide. From the description, I infer that none of the floral bracts is foliaceous as in *C. hostifolium*.

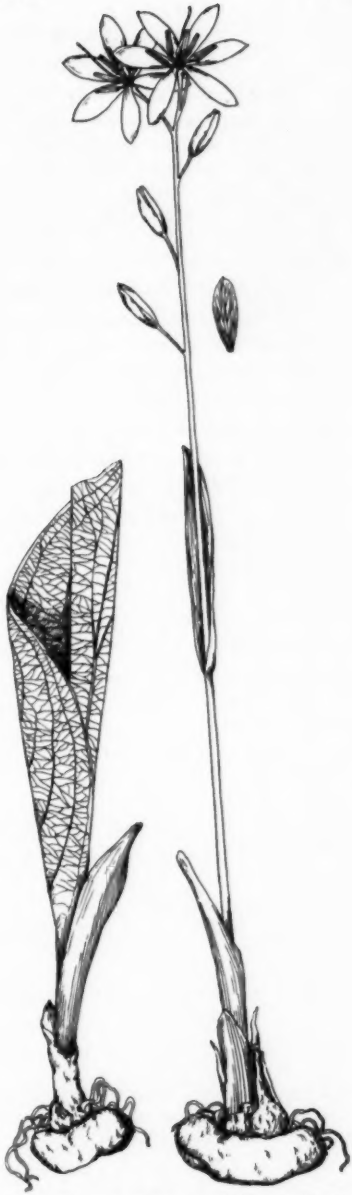
6. **Cyanastrum Verdickii** De Wild., in Ann. Mus. Congo, ser. iv, pt. 1, p. 5 (1902). Based on incomplete specimens collected in November, 1899, at Lukafu, Belgian Congo, *Verdick 275*. The type is in the herbarium of the Jardin de l'Etat in Brussels. I have had the type sheet on loan for study. Fig. 190.

Rootstock and leaves unknown: floral stems 19-25 cm. long, glabrous, subtended at base by a scarious sheathing bract, 4.5 cm. long, obtuse at apex; stem with a linear non-sheathing bract, 3-4 cm. long, about midway between the inflorescence and the base of the stalk; flowers 15-18 in an ebracteate raceme, either solitary or in twos at a node; pedicels slender, spreading or ascending, 1-1.2 cm. long; perianth of 6 equal bluish-violet tepals, oblanceolate or elliptical, acute or obtuse at apex, 1-1.3 cm. long, 3-4 mm. wide; stamens 6, connected at the base, with the filaments 4 mm. long and the anthers yellow, 4 mm. long, dehiscing by apical pores; ovary inferior; style filiform, 8-10 mm. long.

In the ebracteate inflorescence, *C. Verdickii* differs from all other species except *C. Hockii*, which has only four or five flowers in an inflorescence and the upper bract of the floral stem clasping. In this species, the filaments almost or completely equal the anthers.

7. **Cyanastrum Hockii** De Wild., in Fedde, Repert. xi, 517 (1913). Based on specimens collected in 1911 in Belgian Congo, Ober-Katanga, Elisabethville, by A. Hock. The type is in the her-

190. FLOWERS OF *Cyanastrum Verdickii*. (×⅔.)



191. PLANT COMPLETE of *Cyanastrum Hockii*. (×1.)

barium of the Jardin de l'Etat at Brussels. I have had the type sheet on loan for study. Fig. 191.

Flowering plants 13-16.5 cm. high; rhizome tuberous, 1.5-2.4 cm. long, 0.5-0.6 cm. thick: leaf 7.5 cm. long, 4 cm. wide, obovate-oblong, blunt at apex, with parallel arcuate ascending lateral veins connected by numerous transverse veinlets: floral stem with 2 lanceolate scarious sheathing bracts, 3-4 cm. long, acute at apex; inflorescence a raceme of 4 or 5 flowers; flowers solitary at a node, ebracteate, on slender spreading or ascending pedicels, 5 mm. long; perianth of 6 oblanceolate tepals, 1 cm. long, 3 mm. wide; filaments 2 mm. long, anthers yellow, 4 mm. long, dehiscing by apical pores; style slender, much surpassing the stamens.

Of the above seven species, only *Cyanastrum cordifolium* is known at present to be in cultivation in the United States or Canada. This paper calls attention to the other six, some of which might be desirable as warm-house subjects, either for their foliage or flowers. The group offers a fertile field of research for some student who can collect the plants in their native habitats in Africa. There are probably more species to be described, while much must still be learned concerning the several species discussed above. Indeed, the present review reveals how fragmentary is our knowledge of a family which is distributed over a wide area in Africa.

# ARTICLE 25. VARIOUS RARE OR UNUSUAL CULTIVATED PLANTS.

The student of cultivated plants receives for identification specimens of species native in all parts of the world. Since the source of his material often is unknown to him, he cannot turn to some flora or regional paper with the expectation of finding there the name for his specimens, no matter how expert he may be in using keys and reading technical descriptions. Instead he must rely on world monographs, his ability at matching specimens in the herbarium, and particularly his general knowledge of the different kinds of plants, without regard to region of nativity.

The cultivated flora includes all those kinds of plants that are somewhere grown by man. This requires that the student of cultivated plants must be a world botanist, interested in all groups from everywhere. The number of plants in cultivation is constantly increasing and it is possible that every species eventually may be cultivated.

In the present article, the writer considers several diverse species which are still little known in cultivation in the United States and Canada. These species have come from a variety of remote places. Since the books in which descriptions and illustrations of these plants appear may not be available to most readers, regular botanical descriptions and line drawings are provided here, but no attempt is made to furnish complete synonymies. In the preparation of this paper, the writer wishes to express his thanks to the authorities at the United States National Museum for the loan of certain specimens of Araceæ.

1. **Syngonium podophyllum** Schott, in Bot. Zeit. ix, 85 (1851). Based on a Mexican specimen sent in with orchids by Karl Keller. Fig. 192.

   *Syngonium salvadorense* Schott, in Österr. Bot. Zeitschr. viii, 178 (1858). Based on a specimen collected by Wendland at St. Anna, Salvador.

   *Syngonium Oerstedianum* Schott, in Österr. Bot. Zeitschr. viii, 8, 178 (1858). Based on material from Costa Rica.

Perennial vine with the stem 0.5-1.5 cm. in diameter and the internodes 5-10 cm. long: petioles of the juvenile leaves 1.0-2.5 dm. long, the blades sagittate or 3-parted with the lobes oblong-elliptical or oblong-lanceolate, acute or obtuse; petioles of mature leaves 2-3.5 dm. long, vaginate to or above the middle; mature blades 5-7 pedatisect with the lobes oblong-elliptical or oblong-lanceolate, acuminate at the apex, 7-34 cm. long, 1.5-13 cm. wide, not contiguous at base, the external ones often with basal auricles; venation netted, with 4-5 pairs of principal lateral veins alternately

192. PARTS OF *Syngonium podophyllum;* fruiting spathe, leaf and inflorescence. (×⅓.)

arranged and numerous secondary veinlets forming a complicated network: peduncles several, vaginate, 5-11 cm. long, 2-4 mm. thick; tube of spathe 2-5 cm. long, 1-3 cm. wide, oblong-ovoid, varying from glaucous-green to red or purple; blade 6-8 cm. long, 2-4 cm. wide, green to red externally, white to rosy internally, ovate-lanceolate, cuspidulate; synandrium obpyramidal; pistil depressed with a discoid stigma.

This is a common epiphytic vine, ranging from northeastern Mexico to Panama. The writer has studied collections from Mexico (Tamaulipas, San Luis Potosi, Guerrero, and Campeche), Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, and Panama. Cultivated specimens were seen from southern Florida and Dominica, also from a greenhouse in Chicago. Although the label with the Dominican specimen read "probably native," it seems unwise to consider the species indigenous on the island, since this is the only specimen available, and that was collected on a wall at Roseau, where it might easily have been introduced. The specimen from Chicago was received as *Nephthytis triphylla*.

Cultivated specimens sent in for identification from southern Florida first brought this species to the attention of the writer. Material was submitted to one of the largest botanical gardens in the Old World where verification was made as *Pinellia pedatisecta*, but the Florida plants did not match authentic material of that species from China, available at the Bailey Hortorium. In Pinellia the tube of the spathe is closed at the throat, with the staminate and pistillate portions of the spadix separated by a partition which reaches out from the wall of the spathe, but in the plants under discussion the spathe was open at the throat. Search was then made in

193. Detail in *Spathiphyllum cannæfolium*. Plant ×⅗ and flowers ×2.

Philodendron, Xanthosoma, and Syngonium, to determine whether the cultivated plant belonged in any of these genera. Philodendron was at once eliminated because its venation is parallel. The veins of the Florida specimens were definitely netted with the major lateral veins fusing into a collective vein between the margin and the midvein. *Xanthosoma helleborifolia* closely resembled the specimen at hand, but it is an erect species with more membranous leaves, while the writer's puzzle was evidently a vine. Other species of Xanthosoma, like *X. flavomaculata*, which may be only a light-spotted variation of *X. helleborifolia*, likewise are erect herbs. Examination of a large series of *Syngonium podophyllum* revealed that the cultivated plant came within the range of variation of that species and could be matched rather closely. *S. auritum*, grown in Cuba, has the tube and blade of the spathe of about the same length; but *S. podophyllum* has the blade longer than the tube.

194. PLANT AND BLOOM of *Spathiphyllum floribundum*. Plant one-half natural size and flowers two and a half.

In the United States, *Snygonium podophyllum* may be grown in the open in southern Florida or in warm-houses in the northern states. It is a desirable subject for its foliage and bizarre flowers. Several minor variations have been described, but although these may interest the fancier, the writer does not consider them worthy of formal nomenclatorial recognition.

II. **Spathiphyllum cannæfolium** Schott, Aroideæ i, 1, pl. 1 (1853). In Das Pflanzenreich this reference is erroneously cited as in Genera Aroidearum. Fig. 193.

*Pothos cannæfolia*, Dryand. in Bot. Mag. xvii, t. 603 (1802). Based on a specimen cultivated at the Royal Garden, Kew, originally from the West Indies.

Perennial erect herb with the membranous leaves dark green above, paler below, elliptic-oblong or ovate-oblong, 16-50 cm. long, 5-17 cm. wide at middle, abruptly acuminate at apex, gradually tapering into a long sheathing stalk at base, 15-40 cm. long: spathe erect, membranous, green dorsally, white ventrally, elliptic-oblong or lanceolate-oblong, 7-20 cm. long, 2-9 cm. wide, short-cuspidate at apex, abruptly narrowed below and clasping the peduncle: spadix 1-2 cm. above base of spathe, greenish or yellowish, slenderly cylindrical, 2.5-16 cm. long, 0.5-1.2 cm. thick; flowers perfect with the perianth cup-like and the upper margin incurved, often concealing the stamens, and with the pistil stout, vertically flattened, equalling the perianth.

*Spathiphyllum cannæfolium* is native in northern South America and Trinidad. The species has undergone a rather complicated nomenclatorial history. For synonymy, see Engler and Krause in Das Pflanzenreich, IV, 23B, page 32, 1908. Today the plant is passing in botanic gardens and conservatories as *Spathiphyllum cannæfolium*, *S. Dechardii*, *S. candidum*, and *Amomophyllum Dechardii*. The epithet *Dechardii* was first used by André, who described and illustrated the species under the generic name Anthurium in 1877 (Ill. Hort. xxiv, pl. 269). In 1883, the same plant was illustrated in Garden (vol. xxiv, p. 481) as *Spathiphyllum Dechardii*. The latter combination was not validly made and has no botanical standing.

The species belongs to the section Massowia which is characterized by the cup-like perianth, either hexagonal or truncate above, and the vertically flattened pistil which is not exserted. A plant obtained from one source as *S. cannæfolium* has the pistils much exserted and is probably to be referred to *S. Friedrichsthalii* Schott.

Spathiphyllums do best when grown under semi-aquatic conditions. They are desirable for their luxuriant foliage and bright spathes.

III. **Spathiphyllum floribundum** N. E. Brown, in Gard. Chron. x, (n. ser.), 783 (1878). Based on *Anthurium floribundum*, André. Fig. 194.

*Anthurium floribundum*, Linden & André, in Ill. Hort. ii, pl. 159 (1874) (not vol. xxii, 1877, as cited by Engler). Based on specimens which originated in New Granada (Colombia).

Perennial erect herb with the blades of the leaves dark green above, paler below, oblong or oblong-elliptical, 11-21 cm. long, 5-8 cm. wide, abruptly acuminate at apex, gradually tapering or obtuse at base, passing into a petiole 5-15 cm. long, with the lower ¾ strongly sheathing; primary lateral veins of the leaves 15-25, somewhat arcuate-ascending forming an

obtuse angle with the midvein; secondary lateral veins 2-3 between each pair of primary ones: peduncle 12-25 cm. long; spathe oblong-lanceolate or ovate, 4-7 cm. long, 1-3 cm. wide, cuspidate, white; spadix 4-5 mm. above the base of the spathe, cylindrical, obtuse, 3-4 cm. long, 5-8 mm. thick: flowers perfect with the tepals free and the pistil obpyramidal, truncate above.

195. PLANT AND PODS OF *Arabis bellidifolia*. (×¾.)

This species, a native of Panama and Colombia, is usually labelled correctly in American greenhouses. Occasionally it is confused with *S. Patinii*, a related species of the section Amomophyllum, from which it differs in the rather stout petiole which is shorter than or rarely equals the leaf-blades, the oblong-elliptical leaves, and the peduncles which are shorter than or subequal the leaves. In *S. Patinii*, the petioles are long and slender, usually much exceeding the leaf-blades; the leaves are lanceolate; and the peduncles regularly surpass the foliage.

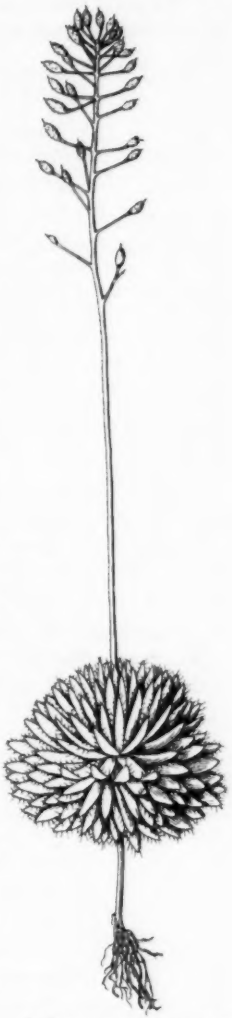
In the herbarium at the Bailey Hortorium is a collection, *L. H. & E. Z. Bailey 209*, June 16, 1931, from Barro Colorado Island, Canal Zone, Panama. Although this was originally identified as *S. Patinii*, it clearly represents *S. floribundum*.. This collection seems significant since Standley (Fl. Panama Canal Zone, Contr. U. S. Nat. Herb. xxvii, 103, 1928) did not list the species, while Engler and Krause, in their monograph (Das Pflanzenreich, iv, 23B, p. 129-130, 1908) cited specimens only from Colombia in South America.

For illustrations additional to Fig. 194, see Florist, 1880, page 76, and Illustration Horticole, 1877, volume ii, plate 159.

IV. **Arabis bellidifolia** Jacq., Obs. Bot. i, 22, pl. 12 (1764). Based on specimens from the Alps. The illustration accompanying the original description has been assumed by the writer to typify the species. Fig. 195.

Perennial usually glabrous herb, 6-25 cm. high; secondary roots rather slender, much branched, from a stout primary root: shoots numerous from a rosette of oblanceolate or spatulate, entire or remotely sinuate-crenate basal leaves, 1.5-6 cm. long, 0.4-1.0 cm. wide, obtuse or broadly rounded at apex, long-tapering at base, glabrous or sometimes sparingly strigose; shoots rigidly erect from a somewhat decumbent base; cauline leaves sessile, oblong or oblong-ovate, with a prominent midvein, blunt at apex, entire or remotely toothed: flowers white, in a dense raceme, much elongating in fruiting condition; sepals erect, green, oblong-ovate, obtuse, 3-3.5 mm. long; petals white, oblong or oblanceolate, rounded at apex, 5-7 mm. long; longer stamens 4-5 mm. long: siliques erect on slender pedicels 6-12 mm. long, compressed, with short stout beak 0.7 mm. long, valves with a strong midvein; body of pod 1.5-3.5 cm. long, 1.5-2 mm. wide, obtuse at both ends; seeds dark brown, roundish, about 1.5 mm. long.

This is an alpine plant. It is frequent on moist rocks and talus in the Pyrenees, Alps, and Carpathian Mountains of Europe. In the American trade it is very rarely offered under its proper name, but has been listed as *A. blepharophylla* and *A. mollis*, two very different species. Although not of spectacular interest, it is an attractive plant for



195. A GOOD ROCK-GARDEN PLANT. *Draba Aizoon*. (×½.)

rock-gardens, where it may bloom in north temperate regions from late April to June and occasionally at other times of the year. In its alpine habitats in Europe, the rosettes remain green and the peduncles persist throughout the winter.

The plant commonly in the trade as *Arabis mollis* is *A. procurrens*. True *Arabis mollis* is apparently not in cultivation in North America.

V. **Draba Aizoon** Wahlenb. Fl. Carp. Princ., p. 193 in note, excl. syn. (1814). Based on plants from the mountains of Hungary. Fig. 196.

*Draba lasiocarpa* Rochel ex Marsch. Bieb. Fl. Taur.-Cauc. iii, 425 in syn. (1819). This is an herbarium name.

Perennial, 4-20 cm. high, with a short caudex bearing a dense rosette of linear-lanceolate leaves, 5-25 cm. long, 1.5-3.0 mm. wide, acute at apex, the margins with slender setose hairs 1-1.5 mm. long, green or sometimes suffused with purple: racemes 10-50-flowered, at first densely congested, later elongating; pedicels 2-10 mm. long; sepals ovate, blunt, 2-3 mm. long, greenish; petals broadly obovate, truncate-emarginate at apex, 4-5 mm. long, bright yellow; stamens 3-4.5 mm. long; pistil with the style 1.2 mm. long: siliques on spreading-ascending pedicels, elliptic-oblong, green, compressed, 5-8 mm. long, 2-3 mm. wide, short-setose, terminated with a filiform style, 1-1.5 mm. long. Native in the mountains of central Europe.

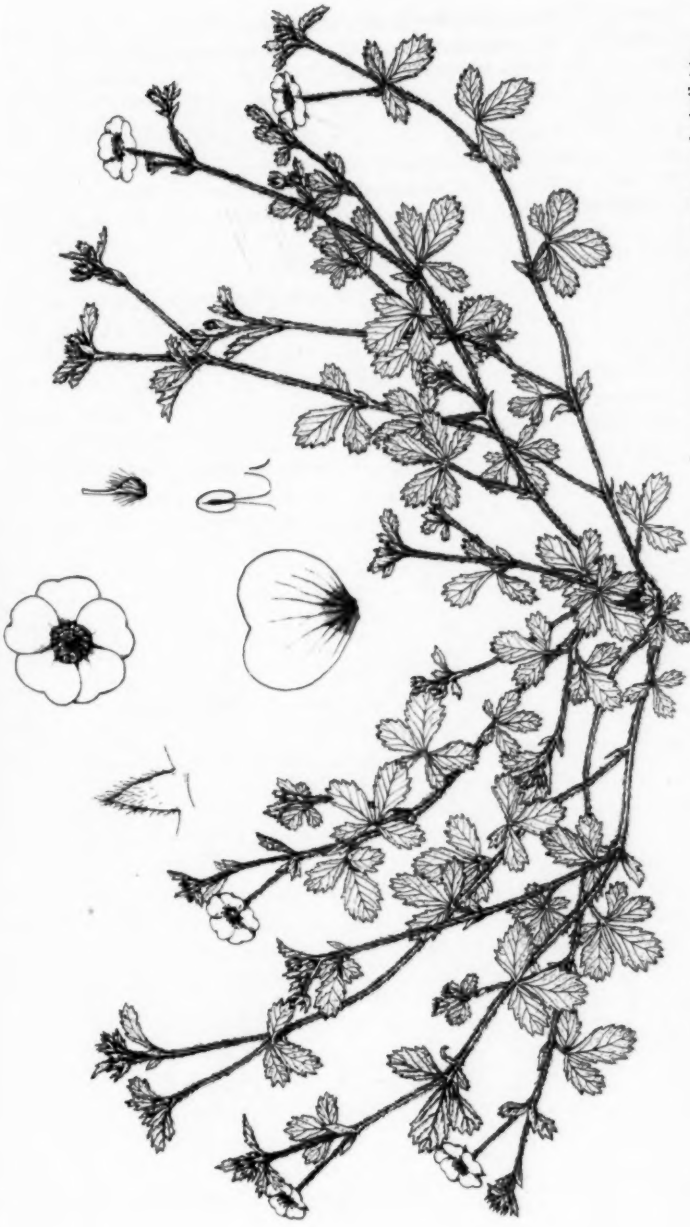
This attractive little mustard was first received by the writer as *Draba hispanica*, from which it can easily be distinguished by its larger size, longer leaves, and smooth scape. *D. hispanica* seldom attains a height of more than 5 cm., while the scape is hairy and the rosette leaves shorter and narrower, to 12 mm. long and 1 mm. wide. Another species with which *D. Aizoon* may be confused is *D. aizoides* which differs in having shorter and narrower leaves to 12 mm. long and 1 mm. wide, and in having racemes with fewer flowers, with the stamens equalling the petals, not shorter as in *D. Aizoon*.

VI. ×**Potentilla tormentillo-formosa** Maund, in The Botanic Garden, vii, no. 585, pl. 147 (1837). Originated in England in 1834 by R. Tongue. The writer has based his interpretation of the species on the illustration accompanying the original description. Fig. 197.

*Potentilla nemorali-formosa* W. H. Baxter, in Loudon, Hort Brit., suppl. 2, 660 (1839). This represents a renaming of Tongue's hybrid.

*Potentilla Tonguei* Hort. ex W. H. Baxter, l.c. This name is given as a synonym for *P. nemorali-formosa*.

Prostrate perennial hybrid herb combining the characters of its parents, *P. nemoralis* Lehm. (*Tormentilla reptans* Stokes) and *P. nepalensis* Hook.



197. PLANT AND DETAILS OF *Potentilla tormentillo-formosa*. Plant ×⅔, flower ×⅘, sepal ×2, petal ×2, stamen ×4, and pistil ×4.

(*P. formosa* D. Don), with the shoots pubescent, 15-35 cm. long, spreading and ascending to a height of 15 cm.: leaves towards base of stems with petioles to 5 cm. long, sessile above, 3-5-foliolate, with the leaflets obovate, 0.5-2.5 cm. long, 0.3-1.5 cm. wide, with margins above and rounded apex coarsely dentate, bases cuneate, strigose on both surfaces; stipules ovate or lanceolate, 4-8 mm. long, 1-4 mm. wide, entire or with 2 coarse teeth: flowers 1.5 cm. in diameter, solitary or in small cymes on slender peduncles, 2-4 cm. long; sepals green, ovate-lanceolate, entire, 4-5 mm. long, 2 mm. wide, strigose; petals yellow, red at base, obovate, broadly rounded and emarginate at apex, 6-8 mm. long, 5-8 mm. wide; stamens 2-3 mm. long; pistils numerous; receptacle densely pubescent.

In gardens this plant is generally labelled *Potentilla Tonguei*. In recent literature it has been referred to both *P. multifida* and *P. nepalensis*. Actually, it is identical with neither of these species, but seems to be precisely what it was originally described to be in 1837, namely the result of a cross between *P. nemoralis* and *P. nepalensis*. Since the original designation was validly published and indicates the status of the plant by combining the names then in use for the two parent species, it is both necessary

198. TWO CONFUSED VIOLETS. *Viola Jooi*, (left); plant ×⅗, seed ×3, pistil ×3. *V. missouriensis*, right; ×⅗.

and desirable again to employ that binomial, *P. tormentillo-formosa*, for this hybrid. *P. Tonguei* is a later name merely listed in synonymy without proper authority.

The writer has before him flowering specimens collected from gardens in New Jersey and New York in June. According to Maund, it may be an almost perpetual bloomer, but he gave the flowering time as principally June and September.

*Potentilla atrosanguinea-pedata* Maund (Bot. Gard. v, no. 385, pl. 97, 1834-35) is taller, to 45 cm., and has larger flowers with deep orange petals. Until the writer has seen fresh material of this plant, he prefers to withhold judgment concerning its proper status.

VII. **Viola Jooi** Janka, in Oester. Bot. Wochenbl. vii, 198-199 (1857). Based on plants from the hills of Transylvania. *Viola sciaphila* Joo is listed as a synonym. Fig. 198.

Perennial scapose herb with slender rootstock, 2-3 mm. in diam., bearing several slender roots: leaves 5-20 with slender petioles, 3-5 cm. long, and with ovate or oblong-cordate blades, obtuse or acute at apex, subtruncate or cordate at base, finely crenate, 1-4 cm. long, 0.5-3 cm. wide, glabrous, with the lateral veins somewhat ascending, but passing out to the margins: peduncles several to many, erect, declinate above, 6-8 cm. long, with a pair of linear bracts, 6-8 mm. long, 0.5 mm. wide; flowers about 2 cm. across face; sepals oblong-lanceolate, acutish or obtuse, green; corolla pinkish-violet, with lateral petals bearded below; pistil and mature capsule glabrous, seeds purple-brown, pyriform, 2 mm. long.

This is a native of southeastern central Europe. In American gardens it is usually correctly labelled, although sometimes it has been eroneously designated *V. missouriensis*. That species differs in having a stout rootstock, yellow or buff seeds, and lateral veins almost parallel to the apex of the leaf. *Viola macroceras* Bunge, a related species native in Siberia, differs in having the spur of the spurred petal much longer, equal to the length of the blade.

In central New York, this species blooms chiefly in May, but continues to produce occasional flowers throughout the summer until frost. For further discussion and an illustration of a wild plant, the student should see pages 38-40 and plate 5 in Julius Römer's Aus der Pflanzenwelt der Burzenländer Berge in Siebenburgen, 1898.